PRO GROW
INDUSTRY LEADING PERFORMANCE

PRO GROW LED - PPFD User Guide (µmol/m2/s).								
LED Fixture	60 W 1 Bar	100 W UFO	200 W UFO	300 W UFO	500 W UFO	630 W 6 Bar	780 W 8 Bar	E800 8 Bar
Total PPF	140 µmol/s	210 µmol/s	420 µmol/s	620 µmol/s	1050 µmol/s	1760 µmol/s	2000 µmol/s	2400 µmol/s
PPF Efficacy	2.4 µmol/J	2.3 µmol/J	2.3 µmol/J	2.3 µmol/J	2.3 µmol/J	2.8 µmol/J	2.82 µmol/J	3.0 µmol/J
Kelvin	6.5K	4 K	4 K	4 K	4 K	4.3 K	3.8 / 4.2K	4 K
CRI	90	90	90	90	90	88.2	91	90
Effective Coverage	0.25 m^2	0.25 m^2	0.56 m^2	1 m^2	1.44 m^2	1.44 m^2	2.25 m^2	2.25 m^2
Output PPFD (µmol/m2/s).	250 @ 30 cm	342 @ 30 cm	730 @ 30 cm	1250 @ 30 cm	1297 @ 40 cm	1220 @ 30 cm	1411 @30 cm	1870 @30 cm

STAGE	DLI	PPFD	Recommended Height Of LED Fixture Above The Canopy @ 100% Intensity							
Unrooted Clones & Seeds (18 hour Photoperiod)										
7-14 days	8	125	50 cm	70 cm	-	-	-	-	-	-
Rooted Clones & Seedlings (18 hour Photoperiod)										
Week 1	12	200	40 cm	55 cm	90 cm	105 cm	-	-	-	-
Week 2	16	250	30 cm	45 cm	80 cm	95 cm	115 cm	127 cm	-	-
Week 3	19	300	25 cm	30 cm	77 cm	85 cm	105 cm	125 cm	-	-
Mother Plants	35	550	-	18 cm	50 cm	67 cm	80 cm	80 cm	88 cm	140 cm
Vegetative (18 hour Photoperiod)										
Week 1	25	400	15 cm	25 cm	70 cm	78 cm	95 cm	100 cm	110 cm	160 cm
Week 2	30	475	10 cm	22 cm	55 cm	76 cm	88 cm	90 cm	100 cm	150 cm
Week 3	35	550	-	18 cm	50 cm	74 cm	80 cm	80 cm	88 cm	140 mm
Week 4	40	625	-	15 cm	44 cm	61 cm	76 cm	70 cm	80 cm	130 mm
Week 5	43	675	-	10 cm	38 cm	58 cm	73 cm	66 cm	75 cm	125 mm
Flowering (12 hour Photoperiod)										
Week 1	30	700	-	-	32 cm	55 cm	72 cm	62 cm	70 cm	122 cm
Week 2	35	825	-	-	28 cm	50 cm	66 cm	57 cm	62 cm	100 cm
Week 3	40	940	-	-	25 cm	47 cm	58 cm	48 cm	55 cm	87 cm
Week 4	45	1050	-	-	15 cm	42 cm	53 cm	39 cm	48 cm	71 cm
Week 5 - 6	50	1175	-	-	10 cm	33 cm	48 cm	34 cm	40 cm	64 cm
Week 7 - 9	45	1050	-	-	15 cm	42 cm	53 cm	39 cm	48 cm	71 cm

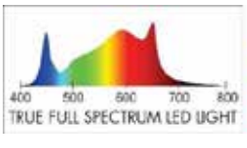
A Simple guide to using LED's

PPFD User Guide:
The PPFD User guide tells you at what height to run your fixture on any given week of your grow/bloom cycle. It is important to follow these recommendations. The correct fixture height will ensure you aren't giving your plants too much light, too soon. When using high quality full CRI LEDs start with reduced light, increasing to full light output near the end of flowering.

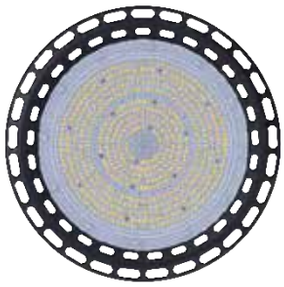
Only Use Quality Diodes:
Older LED diode designs such as COB (chip on board) were not specifically designed for horticultural use. They produced narrow bands of colour and delivered only red, white, and purple light. Unfortunately, the marketing hype exaggerated their effectiveness and gave LEDs a poor reputation until the invention of full spectrum Single Mount Diodes. There is currently a handful of stand-out Single Mount Diodes available for horticultural use. They include the flagship 4K Samsung LM301H, Osram Hyper-red and the new Seoul 5050 White. PRO GROW LEDs offer the best array of diodes for the job at hand. With the introduction of our 3 channel adjustable LEDs this now includes the latest range of Optimum 'Horti-spec' diodes in 5K blue, 730 nm Far-red, 310 UVB and 390 nm UVA formats.
Our new EVO LED range also integrates the latest phosphor coated 4,000°K EVO diode from Samsung.


Samsung LM301H

CRI - Colour Rendering Index:
Quality LEDs have a high CRI averaging 90. The almighty sun has a perfect CRI of 100 and is standard from which we measure CRI. This means we can choose six (or more) different kelvin outputs from the many available diodes. The colour crossover from the multiple kelvin ranges results in a full spectrum output. Quality LED's deliver nearly all the available spectrum of sunlight (now including UV and infrared). This is a lot of light information for a plant adapted to HPS light to process. A HPS lamp only produces a CRI of 30, you cannot compare LED to HPS by just lumens or PPFD output. If you run your latest generation LED too close to the plant canopy you may experience leaf bleach and stunted growth. It is especially important in the growth period not to place them too close to growing plants. We have provided a PPFD chart to help you with distance.



Adapting to high PPFD:
If a plant/strain/cutting has been grown (and re-grown) under lower light levels, they will struggle to adapt quickly to the higher PPFD outputs of next generation LEDs. For example, if someone uses a 600 W HPS in a 1.2 x 1.2 metre space, and then replaces it with a 630 W LED, the actual light intensity (PPFD) is almost doubled (especially if the lamp is at the end of its service life). This will be a huge shock to that strain and will struggle with the increased light intensity. Refer to the PPFD user guide to help reduce this issue. Growing plants from seed can be beneficial when swapping to LEDs, as seeds are not adapted to previous lighting conditions.



Less Heat Means More Nutrient Uptake:
With LED fixtures the heat is emitted from the back of the fixture and not the front (as with HID fixtures). As a result, the plants do not transpire as much to keep themselves cool, and don't take up as much water. It is recommended to run a higher strength nutrient solution. A 10% stronger nutrient mix than your previous HID room is a good place to start. Up to 20% stronger in a high intensity, high wattage LED room is acceptable. Up to 30% stronger with CO2 is achievable. Infrared light is greatly responsible for high leaf surface temperatures and high transpiration rates associated with HID lighting. LED's do not produce any infrared waves and therefore leaf surface temperature and transpiration is reduced.

Less Heat Means less Watering:
Less transpiration means your plants do not need to be watered as often. Simply swapping out straight coco for a coco/perlite mix is advised if you don't want to reduce your current watering regime. Some growers even recommend using straight perlite and to water only a couple of times a day. Of course, every room and phenotype is different so a little R&D will be required. What we absolutely can say is that less watering is required, especially during the growth stages.

Cooler Ambient Air Temperature:
Obviously, this can be an issue in cold climates. Root zone temperature is far more important in winter than ambient air temperature. Keep your rootzone warm with heat cords, heat mats, water heaters, etc. Increase air temperature by reducing the speed of your intake/outlet fans. Other options include air-conditioning, heaters, and CO2 burners. If managed correctly, the upside of growing in cooler air temperatures can result in denser and higher quality flowers, with increased trichome, terpene and flavonoid production .

More Circulation (not ventilation):
Reduced transpiration will require more air movement within the room. This helps change the microclimate of the leaves and increases the transpiration rate. Add an extra oscillating fan or two. Turn them up and always keep the leaves moving. Strengthened branches and stems will support more flower weight.

More Growth Means More Leaves:
Increased light intensity will result in reduced internodal length. Be sure to strip shade leaves more often to ensure light penetration. Your flowers will thank you for it in the end. There are many opinions on how and when to leaf strip. Consult your local garden store to ensure you are doing it right.

CO2 and LEDs:
The reduced heat load allows growers to use supplemental CO2 more efficiently to further increase their yields. The increased light intensity together with the cooler ambient air temperatures makes for a more suitable environment for CO2 injection.

Daily Light Integral (DLI):
For information on DLI please refer to our DLI chart and PPFD to DLI calculator on our website @ pro-grow.com.au

Happy Growing!